NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

CONTOUR BUFFER STRIPS

(acre)
Code 332

DEFINITION

Narrow strips of permanent, herbaceous vegetation cover established across the slope and alternated down the slope with parallel, wider cropping strips.

PURPOSE

- To reduce sheet and rill erosion.
- To reduce transport of sediment and other water-borne contaminants downslope, on-site or off-site
- To enhance wildlife habitat.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland. It is most suitable on uniform slopes ranging from 4 to 8 percent with slope lengths less than the Critical Slope Length (Critical Slope Length = length of slope above which contouring loses its effectiveness). It is also most suitable in regions where rainfall intensities are low to moderate (10 year EI between 160 - 200). EI = storm energy * intensity.

This practice is not suited to fields with extremely long slopes whose length exceeds the critical slope length for contouring by more than 1.5 times, unless the field slope length is shortened by the installation of other practices (e.g. terraces).

The practice is more difficult to establish on undulating to rolling topography because of the difficulty of maintaining parallel strip boundaries across the hill slope or staying within row grade limits.

The narrow strips of permanent vegetative cover are not a part of the normal crop rotation.

This standard does not apply to situations where the width of the buffer strips will be equal to or exceed the width of the adjoining crop strips.

CRITERIA

Criteria Applicable to Both Reducing Sheet and Rill Erosion and Reducing Transport of Sediment and Water-Borne Contaminants.

Row Grade, Strip Boundaries, and Baselines

The grade of the cropped strip shall be aligned as closely as possible to the contour to achieve the greatest erosion reduction possible. The maximum grade of rows within the crop strips shall not exceed one half of the up and down hill field slope or 2 percent, whichever is less.

For crops sensitive to ponded water for periods less than 48 hours, design a positive row grade of not less than 0.5 percent from the nose of a hill or ridge toward a stable outlet. Up to 3 percent row grade is allowed for a maximum of 150 feet as crop rows approach a stable outlet.

The grade along the up slope side of the vegetated buffer shall be the same as for the cropped strip directly above it.

When the grade of any crop strip reaches the maximum allowable design grade, a new baseline shall be established up or down slope from the last

buffer strip and used for the layout of the next crop strip.

Arrangement of Strips

Cropped strips shall be alternated with buffer strips down the hill slope. Normally, a crop strip will occupy the area at the top of the hill.

When used in combination with terraces with underground outlets, diversions, or water and sediment control basins, the layout of buffer strips shall be coordinated with the grade and spacing of the terraces so that strip boundaries will parallel terraces wherever possible. The buffer strip shall occupy the terrace or diversion berm, a channel leading to a water and sediment control basin, or lie immediately up slope of the terrace or diversion channel.

Stable Outlets

Surface flow from contoured crop rows shall go to a stable outlet. Stable outlets include grassed waterways, underground outlets for terraces or diversions, water and sediment control basins, field borders, headlands or end rows, or similarly stabilized areas.

Additional Criteria to Reduce Sheet and Rill Erosion

Width of Strips

The buffer strips shall be of equal width, except when a varying width buffer strip is needed to keep either a cropped strip adjacent to it of uniform width or to maintain the strip boundary grades within the criteria set above. Width of buffer strips at their narrowest point shall be no less than 15 feet for grasses or grass legume mixtures and no less than 30 feet when legumes are used alone.

Cropped strips shall be of uniform width between buffer strips and not exceed the lesser of:

(1) 50 percent of the slope length (L), used for the erosion calculation, or

(2) 50 percent of the critical slope length for contour buffer strips. (The critical slope length for contour buffer strips is calculated by multiplying 1.5 times the critical slope length for contour farming as determined by using approved erosion prediction technology).

Cropped strip width shall be designed to account for some multiple of full equipment width.

Vegetation

Vegetation grown on buffer strips designed to reduce sheet and rill erosion shall be established to permanent vegetation consisting of grasses, legumes, or grass-legume mixtures, adapted to the site, and tolerant of the anticipated depth of sediment deposition. No plants listed as a Category I invasive species on the noxious weed list of the state shall be established in a buffer strip cropping system. Vegetative species maybe selected form the Florida NRCS Conservation Practice Standard, Pasture and Hayland Planting, Code 512 or the Florida Agronomy Field Handbook for recommended species, seeding rates, and fertility recommendations.

The buffer strips shall have a Vegetative Cover-Management Condition of 1 (established meadow - very dense cover) or 2 (1st year meadow or grass legume hay just before cutting) that provides protective cover and induces sediment deposition during periods when erosion is expected to occur on the cropped strips. Cropped strips will normally be expected to have a Cover-Management Condition within the range from 3 (heavy dense cover or very rough) through 7 (Clean tilled, smooth or fallow). (Cover Management Conditions are described in Chapter 6, Revised Universal Soil Loss Equation, Table 1 of the Florida Agronomy Field Handbook).

The stem density for grass species shall be greater than 50, and for legumes, greater than 30 stems per square foot.

Level of Erosion control

The level of erosion control achieved by the buffer strip cropping practice shall meet or exceed the soil erosion level specified by the conservation plan objective. It shall be determined using the approved erosion prediction technology, accounting for the impact of other conservation practices in the system.

Headlands or End Rows

On fields where row crops are a part of the rotation, keep headlands or end rows in permanent sod if their row grade would be steeper than the designed grade of the crop strip.

Additional Criteria to Reduce the Transport of Sediment and Other Water-Borne Contaminants Downslope

Vegetation

Buffer strips designed to reduce the transport of sediment and other water-borne contaminants shall be established to permanent sod forming vegetation with stiff, upright stems only. No plants listed as a Category I invasive species on the noxious weed list of the state shall be established in a buffer strip cropping system.

Width of Strips

On cropland having slopes exceeding 3 percent, the buffer strip width shall be based on the minimum criteria given above to reduce sheet and rill erosion. On slopes 3 percent or flatter, the width of the buffer strip shall be 15 feet or wider.

The maximum width of cropped strips between buffer strips shall be one half of the field slope length not to exceed 150 feet. Cropped strip width shall be designed to account for some multiple of full equipment width.

Arrangement of Strips

Buffer strips and crop strips shall be alternated down the hill slope. A buffer strip shall be established at the bottom of the slope. This width of this buffer strip shall be two times the width of the other buffer strips in the system.

Headlands or End Rows

Headlands or end rows shall be vegetated and have a minimum width of 15 feet between the end of the tilled strip and the field's edge.

Additional Criteria to Enhance Wildlife Habitat

To enhance wildlife habitat a native, warm season grass species mixture, recommended for wildlife purposes, shall be used where adapted.

Delay mowing the buffer strips to every other year or every third year depending upon geographical location.

Mow only after the prime nesting or young bearing period for desired species of ground nesting wildlife have hatched. Allow for re-growth before the growing season ends.

To enhance wildlife cover, the width of buffer strips shall be increased to 30 feet or wider as determined based on the requirements for nesting and escape cover of the target wildlife species.

The maximum width between buffer strips shall not exceed 300 feet.

CONSIDERATIONS

Protect areas of existing or potential concentrated flow erosion by any one or more suitable conservation practices, such as grassed waterways, water and sediment control basins, or diversion terraces.

When the slope length exceeds the critical slope length for the cover-management condition that best characterizes the field to be contour buffer stripped, establish structures, such as terraces, to reduce the slope length below critical if the soil loss objective is not reached. (Design Guidance: Critical slope lengths can be increased by retaining crop residue on the soil surface of the cultivated strips using crop residue management practices. Certain tillage practices can also be used on the cultivated strips to increase random roughness to cause deposition to occur in depressions between soil clods. However, if the cropped strips are kept very rough, in high ridges, or under heavy residue cover, the need for contour buffer strips as an erosion and sediment reduction practice will be reduced since less sediment will be delivered to them.)

On fields where row crops are a part of the rotation, consider establishing field borders on headlands or end rows, which are steeper than the designed grade of rows in the cropped strip. Where contour row curvature becomes too sharp to keep equipment aligned with rows during field operations, consider increasing the buffer strip width to avoid sharp ridge points. In drainageways, consider establishing grassed waterways at least to the point of sharp curvature. These strips should be wide enough to allow the equipment to be lifted and/or turned to meet the same rows across the turn strip.

Prior to design and layout, consider removing any obstructions or making changes in field boundaries or shape, where feasible, to improve the effectiveness of the practice and the ease of performing farming operations.

Prior to layout, inspect the field's position on the landscape to find key points for commencing layout or getting the width of one set of strips (one cultivated and one buffer) to pass by an obstruction or ridge saddle. Considering grade limits, whenever possible, run strip boundaries parallel with fence lines or other barriers. Account for uncropped access road widths when they must traverse the field by adjusting strip boundaries on either side accordingly.

Some non-noxious weedy growth may be allowed in the strips as they provide an insect source for young birds. Also, consider adding native forbs to the seeding mixture when they are available.

The standing residual cover provides early and late season nesting and escape cover for many species of wildlife displaced from other mowed areas.

PLANS AND SPECIFICATIONS

Specifications for installation, operation, and maintenance of Contour Buffer Strips shall be prepared for each field according to the Criteria, Considerations, and Operations and Maintenance described in this standard, and shall be recorded on specification sheets, job sheets, narrative statements in conservation plans, or other acceptable documentation.

Any of the adapted pasture grasses, with or without legumes, may be used for strips. In addition, small grain or other close-growing crops may be used if they provide a good cover when the cultivated area is most susceptible to erosion. See Florida NRCS Conservation Practice Standard, Pasture and Hayland Planting, Code 512, or the Florida Agronomy Field Handbook for recommended species, seeding rates, and fertility recommendations.

OPERATION AND MAINTENANCE

Conduct all farming operations parallel to the strip boundaries except on headlands or end rows with gradients less than the criteria set forth in this standard.

Time mowing of buffer strips to maintain appropriate vegetative density and height for optimum trapping of sediment from the upslope cropped strip during the critical erosion period(s). If wildlife enhancement is desired, delay mowing until after the prime nesting or young bearing period for the desired species of ground nesting wildlife have hatched. Refer to the Upland Wildlife Habitat Management Standard, Code 645 for guidance.

Fertilize buffer strips as needed to maintain stand density. Refer to the Nutrient Management Standard, Code 590 for guidance.

Mow sod turn strips and waterways at least annually.

Spot seed or totally renovate buffer strip systems damaged by herbicide application after residual action of the herbicide is complete.

Redistribute sediment accumulations along the upslope edge of the buffer-crop strip interface upslope over the cultivated strip when needed to maintain uniform sheet flow along the buffer/cropped strip boundary. If sediment accumulates just below the upslope edge of the buffer strip to a depth of 6 inches or stem density falls below specified amounts in the buffer strip, relocate the buffer/cropped strip interface location. Cultivated strips and buffer strips shall be rotated so that a mature stand of protective cover is achieved in a newly established buffer strip immediately below or above the old buffer strip before removing the old buffer to plant an erosion-prone crop. Alternate repositioning of buffer strips to maintain their relative position on the hill slope.

Renovate vegetated headlands or end row area as needed to keep ground cover above 65 percent.

REFERENCES

NRCS Conservation Practice Standards

- Nutrient Management, Code 590
- Pest Management, Code 595
- Pasture and Hayland Planting, Code 512
- Upland Wildlife Habitat Management, Code 645

Florida Agronomy Field Handbook
Revised Universal Soil Loss Equation
Florida Erosion Control Handbook